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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/039,016	01/02/2002	Robert C. Glenn	42390P12278	7520

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EXAMINER

TRAN, KHANH C

ART UNIT PAPER NUMBER

2631

DATE MAILED: 09/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/039,016

Applicant(s)

GLENN ET AL.

Examiner

Khanh Tran

Art Unit

2631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,7,17,25 and 28 is/are rejected.
- 7) ☒ Claim(s) 3-6,8-16,18-24,26,27,29 and 30 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07/01/2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The Amendment filed on 06/29/2005 has been entered. Claims 1-30 are pending in this Office action.

Response to Arguments

2. Applicant's arguments, see pages 4-5 of the Remarks, filed 06/29/2005, with respect to the rejection(s) of claim(s) 1, 2, 7, 17, 25 and 28 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Buchwald et al. U.S. Patent 6,509,733 B2.

Examiner's comments: Applicants correctly point out the phase signal 348 as recited in the last Office action is not equivalent to the claimed recovered clock according to Buchwald et al. teachings. However, after further reviewing Buchwald et al. invention, a new ground of rejection is made below.

3. The objection of the Drawings has been withdrawn after Applicants made the correction.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-2, 7, 17, 25 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buchwald et al. U.S Patent 6,509,733 B2.

Regarding claim 1, referring to figure 3, in column 9 lines 3-67, Buchwald et al. teaches a timing recovery module 202 comprising:

- *a phase controller 302 including data path 308, a phase path 310, a phase detector 312 coupled to the data and phase paths, and a phase error processor 314 coupled to the phase detector; see column 9, lines 4-67. The phase controller 302 produces a plurality of digital control signals 340, which correspond to the claimed interrelated control signals. In column 9, lines 55-67, Buchwald teaches that **phase detector 312 (see figure 3) detects a phase error 350 between data sampling signal 208 and serial data signal 104** based on the data samples in data signal 346 and the phase samples in phase signal 348. The data sampling signal 208 is also a timing signal; see column 9, lines 25-30. In view of the aforementioned teachings, the data-sampling signal 208 corresponds to the claimed recovered clock signal. Therefore, the phase*

controller 302 generates plurality of digital control signals 340 based on the comparison between data sampling signal 208 and serial data signal 104 as recited above;

- a phase interpolator 306 coupled with the phase controller 302 producing timing/sampling signal 208 and a second timing/sampling signal 344 offset in phase from sampling signal 208, based on reference signal set 206 and a plurality of digital control signals 340 applied to the phase interpolator.

Buchwald et al. does not expressly teach the claimed limitations “a *phase interpolator to change a phase of the recovered clock signal with an analog transition based upon a combination of amplitude contributions from more than one phase of a reference clock signal, wherein the amplitude contributions from more than one phase are weighted in accordance with the interrelated control signals*”. In column 9, lines 20-27, see also figure 3, Buchwald et al. teaches that signal set generator 334 generates a set of reference signals 206, all having the same frequency but different predetermined phases. As recited above, the phase signal 348 is the recovered clock as claim because the phase signal 348 includes a series of phase samples. In light of the foregoing discussion, it would have been obvious for one of ordinary skill in the art at the time the invention was made that the phase interpolator 306 changes a phase of the second timing/sampling signal 344 based on the

set of reference signals 206 having the same frequency but different predetermined phases. Furthermore, the phase interpolator 306 also receives a plurality of digital control signals 340 generated by the controller 302. As result of that, the amplitude contributions from more than one phase are weighted in accordance with the plurality of digital control signals 340.

Regarding claim 2, Buchwald et al. invention differs from the instant application in that the phase detector 312 is part of the phase controller 302. Despite of the slight difference, one of ordinary skill in the art would have recognized that the claimed limitations are within the scope of Buchwald et al. teachings. Furthermore, phase detector 312 detects a phase error between data sampling 208 and serial data signal 104 based on the data samples in data signal 346 and the phase samples in phase signal 348, which determines the sample rate of phase detector 312; see column 9, lines 58-67.

Regarding claim 7, referring to figure 3, in column 9, lines 19-27, signal set generator 334 generates the set of reference signals 206 based on reference signal 336. The reference signal 336, corresponding to the claimed reference clock, is coupled to the phase interpolator 306 to generate a reference signal 206 having different predetermined phases.

Regarding claim 17, claim 17 is rejected on the same ground as for claim 2 because of similar scope. Claim 2 claims all elements that can perform all steps of claim 17.

Regarding claim 25, referring to figure 3, in column 9 lines 3-67, Buchwald et al. teaches a timing recovery module 202 comprising:

- Figure 1 shows a communication system 100 including a transmitter 100 and a receiver 102. The receiver 102 includes a front-end receiver to amplify the data as appreciated by one of ordinary skill in the art.
- a phase controller 302 including data path 308, a phase path 310, a phase detector 312 coupled to the data and phase paths, and a phase error processor 314 coupled to the phase detector; see column 9, lines 4-67. The phase controller 302 produces a plurality of digital control signals 340, which correspond to the claimed interrelated control signals, **based on data sampling signal 208 and serial data signal 104 as recited in claim 1.** The data-sampling signal 208 is the recovered clock as discussed in claim 1 rejection. Buchwald et al. invention differs from the claimed invention in that Buchwald et al. teaches that the phase controller 302 includes the phase detector 312, corresponding to the claimed phase-frequency detector, the phase error processor 314, phase control signal rotator 304. Nevertheless, phase control signal rotator 304 is coupled to the phase error processor 314 to generate interrelated control signals based upon the phase error signal from the phase error

processor 314. In light of that, one of ordinary skill in the art would have recognized the interchangeability of the phase error processor 314 for the phase update logic circuitry specified in the application claim.

Furthermore, Buchwald et al. invention differs from the instant application in that the phase detector 312 is part of the phase controller 302. Despite of the slight difference, one of ordinary skill in the art would have recognized that the claimed limitations are within the scope of Buchwald et al. teachings.

- a phase interpolator 306 coupled with the phase controller 302 producing timing/sampling signal 208 and a second timing/sampling signal 344 offset in phase from sampling signal 208. As recited in claim 1,
- Buchwald et al. does not expressly teach the claimed limitations “a *phase interpolator to change a phase of the recovered clock signal with an analog transition based upon a combination of amplitude contributions from more than one phase of a reference clock signal, wherein the amplitude contributions from more than one phase are weighted in accordance with the interrelated control signals*”. In column 9, lines 20-27, see also figure 3, Buchwald et al. teaches that signal set generator 334 generates a set of reference signals 206, all having the same frequency but different predetermined phases. As discussed in claim 1, *the data-sampling signal 208 corresponds to the claimed recovered clock signal*. In light of the foregoing discussion, it would have

been obvious for one of ordinary skill in the art at the time the invention was made that the phase interpolator 306 changes a phase of the timing/sampling signal 208 based on the set of reference signals 206 having the same frequency but different predetermined phases. Furthermore, the phase interpolator 306 also receives a plurality of digital control signals 340 generated by the controller 302. As result of that, the amplitude contributions from more than one phase are weighted in accordance with the plurality of digital control signals 340.

Regarding claim 28, claim 28 is rejected on the same ground as for claim 17 because similar scope. Furthermore, one of ordinary skill in the art would have recognized that the method of claim 17 can be implemented as computer instructions storing on computer hard drive, the computer instructions is executed to cause the computer performing the claimed steps.

Allowable Subject Matter

5. Claims 3-6, 8-16, 18-24, 26-27 and 29-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 571-272-3007. The examiner can normally be reached on Monday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KCT

Khanhcong Tran

09/15/2005

Examiner KHANH TRAN